

Monophyllus redmani. By Jacqueline A. Homan and J. Knox Jones, Jr.

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Monophyllus Leach, 1821

Monophyllus Leach, 1821:75. Type species, *Monophyllus redmani* Leach.

CONTEXT AND CONTENT. Order Chiroptera, Family Phyllostomatidae, Subfamily Glossophaginae. The genus *Monophyllus* includes two Recent species, *Monophyllus redmani* and *M. plethodon*, a key to which follows:

Upper premolars separated by diastema half or more of length of first premolar, second premolar usually crowded against first molar; distribution restricted to Greater Antilles and southern Bahamas *M. redmani*

Upper premolars separated by small diastema less than half of length of first premolar, second premolar usually well separated from first molar; modern distribution restricted to Lesser Antilles *M. plethodon*

Monophyllus redmani Leach, 1821

Greater Antillean Long-tongued Bat

Monophyllus redmani Leach, 1821:76. Type locality Jamaica.

Monophyllus portoricensis Miller, 1900:34. Type locality cave near Bayamón, Puerto Rico.

Monophyllus clinedaphus Miller, 1900:36. Type locality undesignated; restricted to vicinity Baracoa, Oriente, Cuba, by Schwartz and Jones (1967:6).

Monophyllus cubanus Miller, 1902:410. Type locality Baracoa, Oriente, Cuba.

CONTEXT AND CONTENT. See generic summary above. Three subspecies currently are recognized (Schwartz and Jones, 1967):

M. r. redmani Leach, 1821:76, see above.

M. r. portoricensis Miller, 1900:34, see above.

M. r. clinedaphus Miller, 1900:34, see above (*cubanus* Miller, 1902, and *ferreus* Miller, 1918, are synonyms).

DIAGNOSIS. Bats of the genus *Monophyllus* are small to medium in size among glossophagines; tail about half as long as femur and projecting beyond border of uropatagium; zygomatic arch complete; upper incisors small, those of the two pairs of essentially equal size; lower incisors minute, the inner pair separated by a noticeable gap at midline of lower jaw.

The two species of *Monophyllus* are closely related. *M. redmani* differs from *M. plethodon* principally in having the upper premolars separated by a diastema half or more the length of the first premolar (see figure 1) and in occurring only

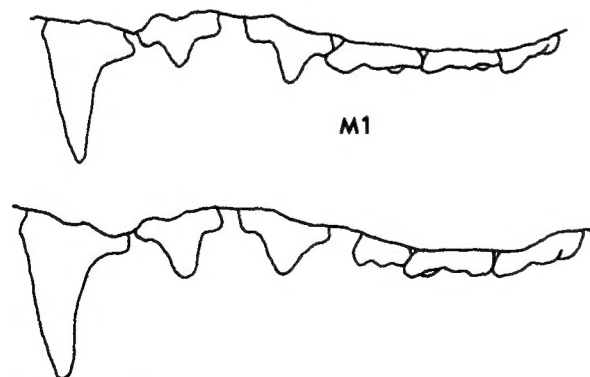


FIGURE 1. Diagrammatic views of upper tooththrows of *Monophyllus redmani* (upper) and *M. plethodon* showing difference in size of diastema between premolars and between last premolar and first molar. Illustration by J. A. Homan.

on the islands of the Greater Antilles. Of the two, *redmani* exhibits considerably more infraspecific variation in size than does *plethodon*. The dental formula of the genus is $i\ 2/2$, $c\ 1/1$, $p\ 2/3$, $m\ 3/3$, total 34. The skull and lower jaw of *M. redmani* are illustrated in Figure 2.

GENERAL CHARACTERS. According to Schwartz and Jones (1967:4), *M. redmani* may be generally characterized by a combination of small to large overall size (for the genus), small hind foot and ear, relatively short forearm, and narrow postorbital area. Color of pelage is brownish, tending generally toward paler shades, to grayish.

Marked variation in size is evident among subspecies of the Greater Antillean long-tongued bat, from *redmani* (largest) through *clinedaphus* to *portoricensis* (smallest). Ranges in measurements (after Schwartz and Jones, 1967, and Buden, 1975) for individuals of the three races are, respectively: total length, 73 to 80, 58 to 73, 60 to 71 mm; length of tail, 8 to 11, 8 to 11, 7 to 10; length of hind foot, 11 to 14, 9 to 14, 10 to 13; length of ear, 13 to 14, 9 to 13, 10 to 12; length of forearm, 37.6 to 41.0, 35.6 to 42.8, 34.8 to 38.5; greatest length of skull, 22.6 to 23.9, 20.8 to 22.6, 19.0 to 20.4; condylobasal length, 20.5 to 22.6, 19.1 to 21.9, 17.4 to 18.9; zygomatic breadth, 9.1

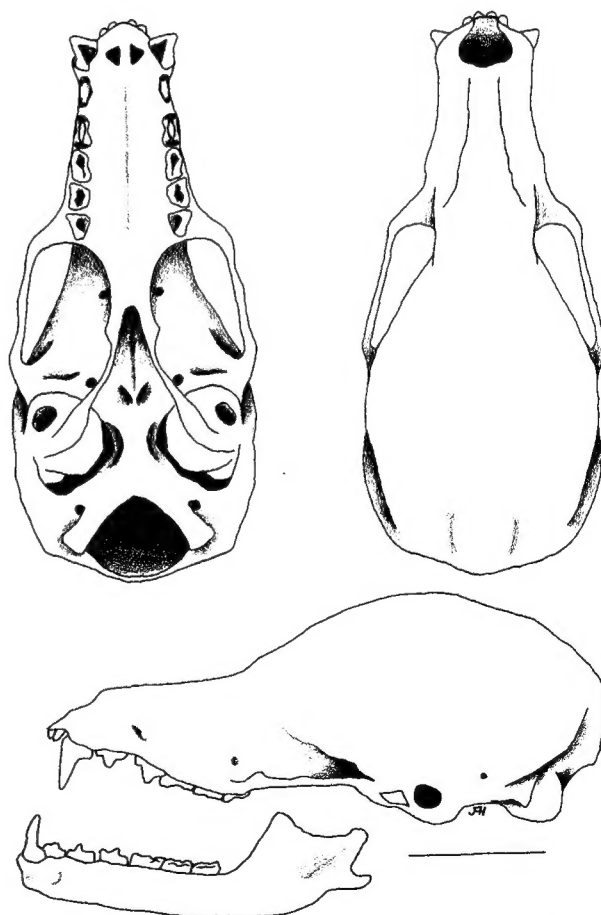


FIGURE 2. Dorsal, ventral, and lateral views of skull, and lateral view of lower jaw of *Monophyllus redmani portoricensis*, male, TTU 9791, from El Yunke National Forest, Puerto Rico. Scale at lower right represents 5 mm. Illustration by J. A. Homan.

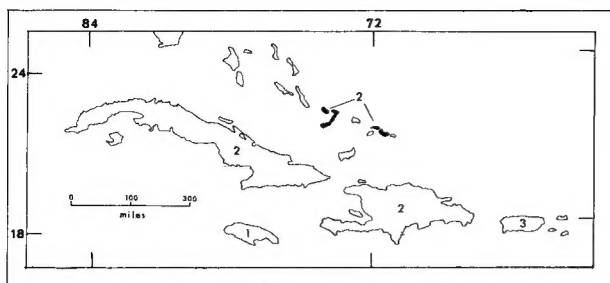


FIGURE 3. Distribution in Antillean region of subspecies of *Monophyllus redmani*: 1, *M. r. redmani*; 2, *M. r. clinedaphus*; 3, *M. r. portoricensis*.

to 10.4, 8.6 to 9.8, 7.9 to 8.8; postorbital constriction, 4.1 to 4.6, 3.8 to 4.6, 3.8 to 4.2; mastoid breadth, 9.3 to 10.0, 8.3 to 9.6, 8.0 to 8.8; length of maxillary tooththrow, 7.7 to 8.9, 7.0 to 8.3, 6.5 to 7.3. Buden (1975) reported on variation in Bahaman populations. He noted that specimens from the Caicos islands were nearly as large as individuals of *redmani* from Jamaica and possibly represent an unnamed subspecies.

DISTRIBUTION. *Monophyllus redmani* is known to occur (figure 3) only on Cuba, Hispaniola, and the southern Bahamas (*clinedaphus*), Jamaica (*redmani*), and Puerto Rico (*portoricensis*).

FOSSIL RECORD. *Monophyllus redmani* has been reported from late Pleistocene or Holocene cave deposits from each of the Greater Antillean islands (see especially, Anthony, 1925; Choate and Birney, 1968; Koopman, 1955; Koopman and Ruibal, 1955; Koopman and Williams, 1951; Miller, 1929; Silva Taboada, 1974; Williams, 1952).

FORM AND FUNCTION. Little is known of form and function in *M. redmani*. Silva Taboada (1974) reported sexual dimorphism in Cuban populations as follows: "In females the premaxilla tends to be narrow and projects forward, whereas in males this region is broader and more rounded anteriorly. As a consequence, females average larger in length of skull, and smaller in alveolar width across canines, than males. Moreover, in females the mandible is conspicuously slender and almost straight, whereas in males it is much broader, with a convex lower profile."

Valdivieso *et al.* (1969) discussed electrophoretic properties of the hemoglobin of *redmani* and other bats from Puerto Rico. A pattern consisting of a single, rapid, anodal band was found in *redmani*. However, the hemoglobin morphs of *Monophyllus*, *Erophylla*, *Artibeus*, and *Stenoderma* were indistinguishable, a fact that Valdivieso *et al.* judged to reinforce the view "that these taxa represent natural assemblages of closely related genera and species." See also Tamsitt and Valdivieso (1969: table 2). Later, Valdivieso and Tamsitt (1974) compared serum proteins of some Neotropical bats and found those of the single *redmani* available to them to be similar to the proteins of a wide variety of other phyllostomatids and of certain bats of other families as well.

Phillips (1971) described the dentition of *Monophyllus* in some detail. He noted that upper teeth in *redmani* are rarely lost in life, but that lower incisors are frequently lost (first lower incisors in 21.4% of males examined and 15.4% of females, for example). Macronyssid mites infesting the oral mucosa of *M. redmani* caused the loss of an upper premolar in one of 75 specimens examined by Phillips.

REPRODUCTION. Buden's (1975) report of pregnant females, each with a single fetus, from one Bahaman island and two in the Greater Antilles is the only information available on reproduction. A female from Middle Caicos, taken on 28 January, carried a fetus that was 20 mm in crown-rump length. Three from Hispaniola, two collected on 3 December and the other on 24 February, had fetuses 16, 18, and 19 mm in length, respectively. One from Puerto Rico was gravid on 5 February.

ECOLOGY. *M. redmani* evidently roosts principally in caves. Near Windsor, Jamaica, specimens were taken well back from the entrance in a moist cave where bats were observed clinging to, and flying just below, the high ceiling (Jones and Schwartz, 1967:6). Miller (1904:344) reported



FIGURE 4. Karyotype of male *Monophyllus redmani* from Puerto Rico (after Baker and Lopez, 1970).

finding *M. redmani* in a damp cave east of Baracoa, Cuba, which was occupied also by *Natalus micropus*, *Mormoops blainvillii*, *Pteronotus parnellii*, *Pteronotus macleayii*, and *Phyllonycteris poeyi*. Haitian specimens of *redmani* were taken "in a large wet cave in a mesic situation in the Monts Carthages massif" (Schwartz and Jones, 1967:10). Anthony (1925:32) noted large numbers of this species in Cueva de Trujillo Alto, Puerto Rico, "... clustered in masses, hanging in deep crevices, or 'chimneys' in the ceiling of the cave and generally ... segregated by sexes." Eighty of 83 specimens taken there in mid-July were males. Individuals knocked into a stream at the bottom of this cave swam readily to the edge and crawled out. Anthony (1919:637) also recorded a specimen taken "in a cave among the hills" in eastern Cuba.

Buden (1975) found large numbers of bats, including *M. redmani*, in a well-aerated cave about 50 m deep, 15 to 20 m wide, and about 6 m high near Cripple Hill on Crooked Island in the Bahamas. The cave had at least two large entrances and most bats, including all *redmani* he observed, frequented solution cavities in the roof in one of the darker parts. The solution cavities ranged up to several m in depth and averaged less than 1 m in width. Individuals of *M. redmani* were found alone or in groups of up to 15 to 20 in these depressions. Buden reported these bats to be extremely wary, taking flight when disturbed by the beam of a flashlight. The only *M. redmani* netted by Buden in the Bahamas was taken in semixerix woods on North Caicos.

Monophyllus is easily taken in mist nets, and *M. redmani* has been netted in various forested situations in recent years. Tamsitt and Valdivieso (1970:E124), for example, took this species along with *Stenoderma rufum* in a net stretched across a clearing at the edge of a forest trail in Puerto Rico. They attempted to keep *M. redmani* alive in the laboratory but were unsuccessful. The bats refused whole and mashed bananas, and sugared water, and died within two days. McNab (1971), Phillips (1971), Radovsky *et al.* (1971) and other authors have indicated that *Monophyllus* feeds on soft fruit or nectar, and possibly also insects, but there are no firm data on food habits.

Silva Taboada (1974) reported a sex ratio of 55 males to 53 females in a random sample collected over two years from a cave in central Cuba. Using the secondary sexual characters listed in Form and Function above, he identified 46 males and 37 females from fossil deposits in the same area.

Radovsky *et al.* (1971) described a macronyssid mite, *Radfordiella monophylli*, from *M. redmani* on the basis of protonymphs found imbedded in the soft palate. Other ectoparasites recorded from this species include the mites *Jamesonia rosickyi* and *Spelaeorhynchus monophylli*, and the bat fly *Trichobius truncatus* (Dusbábek, 1969; Tamsitt and Fox, 1970; Tamsitt and Valdivieso, 1970). In a study of trematodes of Cuban bats, Groschafft and del Valle (1969) found none in five specimens of *M. r. clinedaphus* examined.

GENETICS. *Monophyllus redmani* has a diploid chromosomal complement of 32 and a fundamental number of 60. Autosomes are metacentric or submetacentric; the X chromosome is submetacentric and the Y is a minute element (see figure 4). Baker and Lopez (1970:467) regarded *Monophyllus* as similar to *Erophylla* and *Brachyphylla*, but most closely related to *Glossophaga*, on the basis of chromosomal morphology.

REMARKS. *Monophyllus redmani* closely resembles *M. plethodon* morphologically, the dental characters used in the foregoing key being the only consistent means by which the two can be separated. The occurrence of both species in the

same layers in cave deposits on Puerto Rico (Anthony, 1917, 1925; Choate and Birney, 1968), however, argues for recognition of two species rather than regarding *Monophyllus* as monotypic.

Throughout most of the Antillean region, *Monophyllus* is the only glossophagine bat. However, species of another genus, *Glossophaga*, are known to occur on Jamaica and in the Lesser Antilles as far north as Dominica and may be highly competitive with *Monophyllus* where both occur together. Varona (1974) recently placed *Monophyllus* as a subgenus of *Glossophaga*, but we have not followed his arrangement.

LITERATURE CITED

- Anthony, H. E. 1917. Two new fossil bats from Porto Rico. Bull. Amer. Mus. Nat. Hist. 37:565-568, 1 pl.
- 1919. Mammals collected in eastern Cuba in 1917, with descriptions of two new species. Bull. Amer. Mus. Nat. Hist. 41:625-643, 2 pls.
- 1925. Mammals of Porto Rico, living and extinct. Sci. Surv. Porto Rico and the Virgin Islands. New York Acad. Sci. 9:1-241, 54 pls.
- Baker, R. J., and G. Lopez. 1970. Karyotypic studies of the insular populations of bats on Puerto Rico. Caryologia 23:465-472.
- Buden, D. W. 1975. First records of *Monophyllus redmani* Leach (Chiroptera) from the Bahamas with notes on variation in the species. Jour. Mammal. 56:in press.
- Choate, J. R., and E. C. Birney. 1968. Sub-recent Insectivora and Chiroptera from Puerto Rico, with the description of a new bat of the genus *Stenoderma*. Jour. Mammal. 49:400-412.
- Dusbábek, F. 1969. Generic revision of the myobiid mites (Acarina: Myobiidae) parasitic on bats. Folia Parasit. 16:1-17.
- Groschaft, J., and M. R. del Valle. 1969. Trematodos de los murciélagos de Cuba. Torreia 18(n.s.):1-20.
- Koopman, K. F. 1955. A new subspecies of *Chilonycteris* from the West Indies and a discussion of the mammals of La Gonave. Jour. Mammal. 36:109-113.
- Koopman, K. F., and R. Ruibal. 1955. Cave-fossil vertebrates from Camaguey, Cuba. Breviora 46:1-8.
- Koopman, K. F., and E. E. Williams. 1951. Fossil Chiroptera collected by H. E. Anthony in Jamaica, 1919-1920. Amer. Mus. Novit. 1519:1-29.
- Leach, W. E. 1821. The characters of seven genera of bats with foliaceous appendages to the nose. Trans. Linnean Soc. London 13:73-82.
- McNab, B. K. 1971. The structure of tropical bat faunas. Ecology 52:352-358.
- Miller, G. S., Jr. 1900. The bats of the genus *Monophyllus*. Proc. Washington Acad. Sci. 2:31-38.
- 1902. Twenty new American bats. Proc. Acad. Nat. Sci. Philadelphia 54:389-412.
- 1904. Notes on the bats collected by William Palmer in Cuba. Proc. U. S. Nat. Mus. 27:337-348.
- 1914. Three new bats from Haiti and Santo Domingo. Proc. Biol. Soc. Washington 31:39-40.
- 1929. A second collection of mammals from caves near St. Michel, Haiti. Smithsonian Misc. Coll. 81(9):1-30, 10 pls.
- Phillips, C. J. 1971. The dentition of glossophagine bats: development, morphological characteristics, variation, pathology, and evolution. Misc. Publ. Mus. Nat. Hist., Univ. Kansas 54:1-138.
- Radovsky, F. J., J. K. Jones, Jr., and C. J. Phillips. 1971. Three new species of *Radfordiella* (Acarina: Macronyssidae) parasitic in the mouth of phyllostomatid bats. Jour. Med. Ent. 8:737-746.
- Schwartz, A., and J. K. Jones, Jr. 1967. Review of bats of the endemic Antillean genus *Monophyllus*. Proc. U.S. Nat. Mus. 124(3635):1-20.
- Silva Taboada, G. 1974. Fossil Chiroptera from cave deposits in central Cuba, with description of two new species (genera *Pteronotus* and *Mormoops*) and the first West Indian record of *Mormoops megalophylla*. Acta Zool. Cracoviensia 19:33-73, pls. 2-4.
- Tamsitt, J. R., and I. Fox. 1970. Records of bat ectoparasites from the Caribbean region (Siphonaptera, Acarina, Diptera). Canadian Jour. Zool. 48:1093-1097.
- Tamsitt, J. R., and D. Valdivieso. 1969. Hemoglobin electrophoresis in the systematics of bats (Microchiroptera). Occas. Papers Life Sciences, Royal Ontario Mus. 14:1-12.
- 1970. Observations on bats and their ectoparasites. Pp. E123-E128, in A tropical rain forest (H. Odum, ed.), U.S. Atomic Energy Commission, Washington, D.C., xiv + 1640 pp.
- Valdivieso, D., and J. R. Tamsitt. 1974. Electrophoretic patterns of serum proteins of Neotropical bats (Chiroptera). Life Sci. Contrib., Royal Ontario Mus. 98:1-24.
- Valdivieso, D., J. R. Tamsitt, and E. Conde-del Pino. 1969. Electrophoretic properties of neotropical bat hemoglobin. Comp. Biochem. Physiol. 30:117-122.
- Varona, L. S. 1974. Catálogo de los mamíferos vivientes y extinguidos de las Antillas. Acad. Cien. Cuba, viii + 139 pp.
- Williams, E. E. 1952. Additional notes on fossil and subfossil bats from Jamaica. Jour. Mammal. 33:171-179.

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